Integrative geriatric assessment. A narrative review of the scales and their use in Ecuador

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Abstract:

This study aims to describe the main tools for integrative geriatric assessment and their use in Ecuador. We performed a narrative review with a comprehensive and systematic literature search. 261 original articles were obtained from the primary search, and after the discrimination by the researchers, 76 articles were included in the final analysis. Integrative geriatric assessments cover different areas, including cognitive function, affective function, nutritional status and functionality, and several tools that are used worldwide for this purpose. In Ecuador, a deeper analysis of their use is required to evaluate their diagnostic efficacy and applicability to improve health outcomes for the elderly population.
Key words: geriatric assessment; frail elderly; geriatrics; primary health care; health services for the aged population o (elderly)

Evaluación geriátrica integral. Una revisión narrativa de las escalas y su uso en el Ecuador

Resumen

Este estudio tiene como objetivo describir las principales herramientas de evaluación integral geriátrica y su uso en el Ecuador. Realizamos una revisión narrativa con una búsqueda bibliográfica exhaustiva y sistemática. De la búsqueda primaria se obtuvieron 261 artículos originales, y luego de la discriminación por parte de los investigadores, se incluyeron 76 artículos en el análisis final. La evaluación geriátrica cubre diferentes áreas, incluida la función cognitiva, la función afectiva, el estado nutricional y la funcionalidad, y se utilizan varias herramientas en todo el mundo para este propósito. En Ecuador se requiere un análisis más profundo de su uso para evaluar su eficacia diagnóstica y aplicabilidad con el fin de mejorar los resultados de salud de la población adulta mayor.
Palabras clave: valoración geriátrica; fragilidad del adulto mayor; geriatría; atención primaria de salud; servicios de salud para adultos mayores

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Introduction

Aging, defined by the World Health Organization (WHO) as the "physiological process that begins at conception causing changes throughout the life cycle, which produces limitations in the adaptability of the organism to the environment," is a significant global phenomena with economic, political, and social consequences[1]. Globally, the increase in life expectancy and the decrease in fertility rates have led to rapid aging. It is expected that by 2050, the proportion of the population over 60 years of age will double from 10% to 21%. In developing countries, the elderly population is expected to increase fourfold in the next 50 years. In Europe, almost 19% of the population is currently 65 years or older, a figure projected to rise to 29% by 2060[3]. Ecuador showed a decrease in the fertility rate from 6.7 children per woman (1960) to 2.4 in 2020[4], and the life expectancy increased from 53 (1960) up to 77 years old 5 and the population over 60 years grew to 8% [6].

These demographic changes are associated with increased mortality and differences in morbidity, resulting in higher rates of chronic non-infectious pathologies such as hypertension, diabetes mellitus, and dyslipidemia, as well as musculoskeletal problems. These changes primarily affect global public health.[2]. For this reason, carrying out a comprehensive geriatric assessment in primary health care is crucial, to identify alterations in the functionality of the elderly, and to identify patients over 60 years of age with difficulty in facing the process of change due to inadequate levels of functional adaptability (difficulty performing daily activities) or personal dissatisfaction[7].

The United Nations, through its Sustainable Development Goal 3, expects to ensure healthy lives and promote well-being for all at all ages by 2030[8]. In response, the WHO released the Global Strategy and Action Plan on Ageing and Health, emphasizing the importance of orienting health systems around the assessment of the intrinsic capacity and functional ability of the elderly[9]. The WHO highlights the necessity of providing person-centered integrated care and appropriate information collection related to the ability and capacity of older people.

In 2020, the WHO also published the Integrated Care for Older People (ICOPE): Guidance for Person-centered Assessment and Pathways in Primary Care as an effort to synthesize the assessment of the key domains of intrinsic capacity in the elderly 10. These domains are the vitality and the locomotor, psychological, cognitive, hearing, and visual capacities.

The ICOPE guideline proposes a screening tool to assess all these domains, and if any condition that is associated with a loss in intrinsic capacity is detected, it recommends assessing in greater depth and managing the problem.

Different instruments and tools could be used to assess these domains in greater depth; consequently, this review aims to describe the tools most used in primary care during geriatric comprehensive assessment.

Methodology

A comprehensive bibliographic review until March 30, 2023, was carried out through the application of the following MESH terms: "Primary health care", "Surveys and Questionnaires", and "Geriatric Assessment" through the use of the boolean operators “AND” and “OR” adapted for Pubmed, Web of Science, Scopus, and Cochrane, using a filter for papers published in the last ten years.

The search yielded 261 primary and secondary articles extrapolated to the Rayyan® system to facilitate team and dual work. 94 duplicates were identified and eliminated by the authors, obtaining 167 original articles. The studies were analyzed by eight trained researchers, who initially evaluated the title and abstract before reviewing the complete document, resulting in a total of 76 valuable articles. Data extraction was performed manually through a standardized table in the system. The literature analysis was performed using Microsoft Word for Windows.

Results and discussion

During the development of this review, various scales used in the assessment of the elderly have been identified and were classified by their objectives (Figure 1).

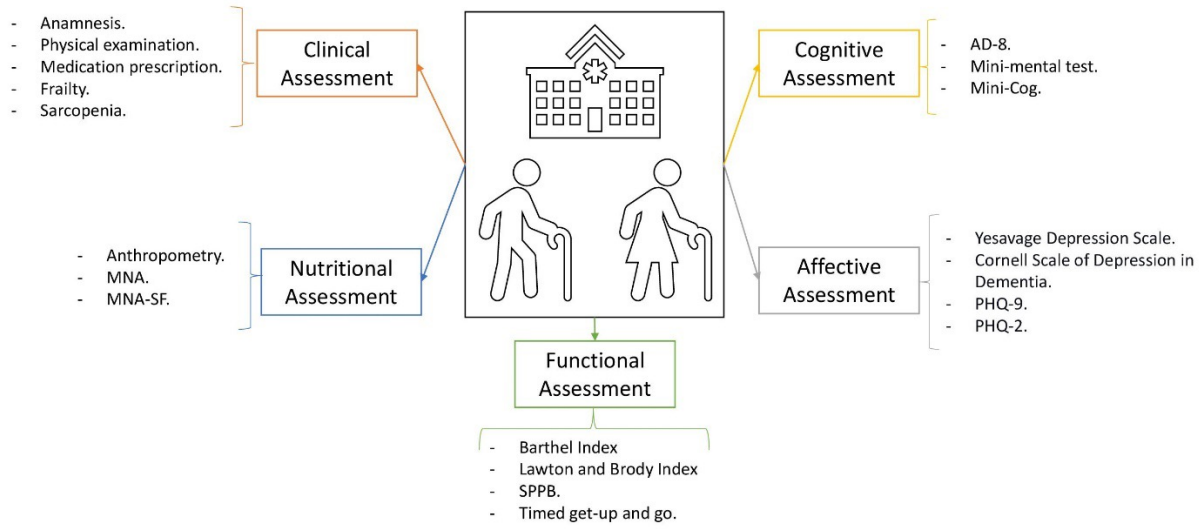

Figure1. Integral Geriatric Assessment

DRUGS PRESCRIPTION

Thirty percent of hospital admissions in older adults are associated with adverse drug reactions (ADR). Therefore, criteria and scales have been developed to assess inappropriate prescriptions (IP)[14–16]. These tools presented some deficiencies such as the inclusion in their lists of medicines that are in disuse or are difficult to access, the omission of IPs produced by pharmacological interactions, duplicate prescriptions, or the omission of the use of appropriate medicines[17]. As a consequence the STOPP criteria (Screening Tool of Older Person's Prescriptions)[18] and START criteria (Screening Tool of Older Person's Prescriptions) were created.[19]

Strategy STOPP/START: These criteria allowed the detection of potentially inappropriate prescriptions and indicated appropriate treatments in older adults [18]. The combination of these criteria has been evaluated, and a favorable agreement has been described for a kappa statistic of 0.93 for the STOPP criteria and 0.85 for the START criteria[20].

In Ecuador, Jijón-Vaca determined that 40.7% of the prescriptions were inappropriate with 81.7% of the people presenting polypharmacy, and of this 78.6% were antihypertensives with inappropriate prescriptions due to the use of loop diuretics without heart failure[21]. Regarding the non-prescription of appropriate medications detected through START, 72% of the participants met at least one criterion (presenting some clinical characteristic that requires a prescription), however, 62.5% did not receive the treatment [21].

FRAILTY AND SARCOPENIA

Frailty is a state of the elderly related to a decreased response to stressors. It is considered one of the most frequent geriatric syndromes with a prevalence of 4 to 17%, and a marked predominance in the female population[22] This condition is associated with a higher risk of falls, disability, hospitalization, and death in this age group[23]. Frailty is considered a reversible state; thus its timely diagnosis is of vital importance. Therefore, several screening instruments applied in primary care have been developed to facilitate the identification of patients at risk of developing this condition (Pre-frail), thereby preventing its onset and providing effective early treatment[22]. The instruments most used in medical consultation are described below (Table 1)[24].

Table 1.- Sensitivity and specificity of the frailty and sarcopenia screening tools.

Tool	Author	Diagnostic cut-off point	Reference test	Sensitivity (CI 95%)	Specificity (CI 95%)	Population
Tilburg Frailty Index	Coelho et al. [39]	≥ 5	Frailty phenotype	0.78	0.59	0.59
FRAIL Scale	Sukkriang et al.[40]	≥ 3	Frailty phenotype	88.0 (68.78 – 97.45)	85.71 (79.90-90.37)	85.71 (79.90- 90.37)
Groningen Frailty Indicator	Clegg et al. [41]	≥ 4	Frailty phenotype	0.58	0.72	0.72
PRISMA-7	Sukkriang et al.[40]	≥ 3	Frailty phenotype	76.0 (54.87 – 90.64)	86.24 (80.50 – 90.81)	86.24 (80.50 – 90.81)
GFST	Sukkriang et al.[40]	Si/No	Frailty phenotype	88 (66.78 – 97.45)	83.6 (77.53 – 88.58)	83.6 (77.53 – 88.58)
SOF Index	Seto et al. [42]	≥ 2	Frailty index -40	17.6	99.5	99.5
SARC-F Scale	Parra-Rodríguez et al. [38]	≥ 4	IWGS	28.33	83.33	83.33

GFST: Gerontopole Frailty Screening Tool

IWGS: International Working Group on Sarcopenia

Frailty phenotype: These diagnostic criteria were standardized by Fried and his team, considering data from the Cardiovascular Health Study (CHS). This work team summarized five objectively assessed components: involuntary weight loss, reduced energy level, reduced grip strength, slow walking speed, and low level of physical activity where the presence of 3 or more indicates frailty [25,26]. This diagnostic criteria is used in the majority of the world and is considered the gold standard for comparison with other instruments [25,27].

Frailty index: Consists of a list of 13 to 92 items that assess different domains related to frailty, including, physical components, associated pathologies, daily activities, and health problems. These variables are coded in two ways through the absence or presence of the characteristic and the ordinal assessment of the statement (0.25 – 0.50 – 0.75 – 1.00). The score is added and divided by the number of questions in a case presenting a value greater than or equal to 0.25 is considered frailty[22,28].

Tilburg Frailty Index: It is a self-reported questionnaire that does not require objective measurements and assesses three domains: psychological, social, and physical [29,30]. It comprises 15 questions valued at 1 point where a score greater than five diagnoses frailty, and its application lasts approximately 14 minutes[31,32].

FRAIL Scale: This tool comprises 5 questions where the accumulation of functional and biological aspects is assessed, such as the presence of fatigue, muscular resistance, aerobic capacity, the burden of disease (5 or more associated pathologies), and weight loss. For the diagnosis,

each item gives a value of 1 point where 0 points are equivalent to robust, from 1 to 2 pre-frail, and more than or equal to 3 fragile points [33,34].

Groningen Frailty Indicator: It's a self-reported questionnaire (which can be self-administered) made up of 15 questions divided into the following domains: physical, cognitive, social, and psychological. Each question awards one point where a result greater than or equal to 4 is considered frailty [35].

PRISMA – 7: Self-administered questionnaire with a duration of approximately 3 minutes where seven questions are asked, requesting information regarding age, sex, autonomy or daily activities, family circle, and ease of ambulation. A score greater than or equal to 3 is considered an older adult with frailty[35].

Gerontopole Frailty Screening Tool (GFST): This instrument has eight questions classified into two segments. The first is a questionnaire where the objective is to identify signs and symptoms related to frailty, such as gait speed, mobility, cognitive impairment, and the social component. The second domain considers the clinical assessment of the family doctor where the results of the first domain are confirmed, and the doctor decides the patient's diagnosis[36,37].

SARC-F Scale: This screening instrument for sarcopenia consists of 5 components that assess strength, mobility, ability to get up from a chair, climb stairs, and history of falls. Each item has a score ranging from 0 to 10 and with a score greater than or equal to 4, it indicates sarcopenia [38].

In Ecuador, Astudillo et al. identified that the prevalence of frailty is 36.7% in older adults in Azogues through the FRAIL scale [39]. Similarly, Sarmiento describes a 55% prevalence of frailty in communities in Cuenca, increasing its presence in those over 80 years, polypharmacy, a clinical history of hospitalizations, and comorbidities [40]. Therefore, screening for this pathology during a medical consultation is crucial.

MALNUTRITION

A large part of the elderly population suffers from malnutrition or is at risk of malnutrition [41], the prevalence of this pathology in Europe is between 30% and 50%. Malnutrition, low body mass index (BMI), and involuntary weight loss are considered to be risk factors associated with mortality and impaired functional status in the elderly population [42], considering their evaluation of great medical relevance. The most used scales are:

Mini Nutritional Assessment (MNA): It consists of 18 sections, in which questions are asked about four aspects: a global assessment, an anthropometric assessment, a dietary assessment, and a subjective assessment. The maximum score is 30 points and according to the results obtained it can be distinguished into three categories: malnutrition (<17), risk of malnutrition (17-23.5), and without malnutrition (>24) [41]. It is 98% accurate when compared to comprehensive nutritional assessments. It has a sensitivity of 96%, a specificity of 98%, and a predictive value of 97% compared to clinical assessment [43].

MNA-SF: This rapid nutrition screening instrument has six questions and eliminates time-consuming subjective elements. A screening score of 12 corresponds to a normal nutritional status, between 8 and 11 points participants are considered at risk of malnutrition, and below 8 points participants are considered malnourished. For a more in-depth evaluation and participants at risk of malnutrition, it is suggested to continue with the full version of the MNA [44]. In comparison, the MNA was classified by 90.7% of the participants correctly or at least in a "non-damaging" manner. However, when the screening process is repeated regularly every three to twelve months, as recommended, the possibility of misclassification is minimized. Another strength of this newly revised MNA-SF is that it allows the use of BMI or calf circumference, allowing its application in immobile individuals or in circumstances where weight and height cannot be measured, such as in low-resource settings [45].

FUNCTIONALITY

Functionality is defined as the ability to perform basic activities such as dressing and bathing or perform (more complex) instrumental activities at home or in the community 46. This characteristic decreases with age or for pathologies or conditions that generate disability, for which it is mandatory to assess it in the health consultation[47]. Various tools have been developed to assess the functionality of

individuals. These tests are designed to detect advanced health problems and medical syndromes in their early stages, enabling timely interventions to prevent rapid progression [46,47].

Barthel Index: This is a functional assessment scale that measures the ability of an individual to perform ten daily activities independently [48]. This instrument requires an interviewer and a general medical examination. The functional evaluation is carried out by evaluating the respondents' basic activities of daily living (BADL) using the Modified Barthel Index (MBI) included in the questionnaire. The highest possible score is 100 points. The higher the score, the more "independent" the individual is. Each patient's score was used to predict their dependence needs. Scores from 0 to 24 were classified as totally dependent, 25 to 49 as severe dependence, 50 to 74 as moderate dependence, and 75 to 90 and 91 to 99 as mild and minimal dependence according to the MBI tool [48].

The index consists of 10 items (scored in increments of 5 points) that relate to activities of daily living (ADLs) and is calculated by summing the response value to each of these items: feeding, bathing, grooming, dressing, bowel control, bladder control, toilet use, transfers (bed to chair and back), and mobility on level surfaces and stairs [49]. Functional independence is defined as the ability to perform all BADL components using the MBI without assistance. In contrast, disability was defined as seeking help to complete at least one BADL component [49].

The sensitivity of the Barthel index is 88% and the specificity 40%. The positive predictive value is 44% and the negative predictive value 86%. The positive and negative likelihood ratios are 1.47 and 0.3 respectively, which demonstrates that most people with recorded changes in their ability to perform activities of daily living, according to the Barthel index, also have improved cognitive function [50].

Lawton and Brody Index: This is a tool developed in 1960 that assesses a person's ability to perform activities of daily living (ADLs), such as grooming, eating, and using the bathroom, as well as independent instrumental activities of daily living (IADL) like competence in shopping, cooking, and managing finance, which are necessary for independent living. These skills are considered more complex than basic activities of daily living measured by the Barthel index [48]. IADLs are typically lost before ADLs, evaluation of IADLs can identify early decline (physical, cognitive, or both) in an older adult that might otherwise appear capable and healthy [48].

The Lawton and Brody IADL scale takes 10 to 15 minutes to apply. It contains eight items with three possible answers: total independence (3 points), assistance required in this activity (2 points), and total dependence on other people (1 point), with a summary score of 0 (low function, dependent) to 8 (high function, independent) 51. The scoring range is from 8 to 24 points. The higher the score, the more capable the person is 52. The level of interobserver reproducibility on this scale is 0.94 53.

Timed get-up and go: This is a fast and easy test for diagnosing gait and balance disorders [54]. Postural control is analyzed with a history of falls in older adults, through three tests: Functional Reach Test (TAF), Timed Up and Go test (TUG) and the Short Physical Performance Battery (SPPB) test[55]. In a prospective observational cohort study, the TUG test was evaluated in older adults and concluded that patients with falls had more difficulties (it took more seconds) to perform the test [56]. The sensitivity of a test that lasts more than 9 seconds is 82% with a specificity of 34% 57. In Ecuador, the cut-off time of >12 seconds showed a sensitivity of 75.68% and a specificity of 54.72%[58].

COGNITIVE

Cognition consists of processes (sensation, perception, attention, and memory) that give the human being the ability to know, capture, and retain ideas and information. After 60 years, the brain shows changes, including losing 2 to 3 g of weight [59]. For this reason, different tools were created for mental evaluation in primary health care [60]. The most used are described below.

Informant Questionnaire of Eight Elements to Determine Dementia (AD-8): This questionnaire consists of eight items that help to detect cognitive impairment in a short time (average 3 minutes) [60–62]. Each item presents a dichotomous response (yes or no) and fundamentally assesses four domains: memory, endurance, execution capa-

city, and complex functions 61. Galvin JE. et al. describe an 85% sensitivity, 86% specificity, and an area under the curve of 90% to discriminate non-dementia of dementia. It was also shown that the questionnaire presented a remarkable correlation with the clinical assessment of dementia [63].

Mini-mental test (MMSE): Standard assistance tool for cognitive evaluation, used in the diagnosis but not to state the severity of dementia [64]. It is an evaluation with 30 questions covering different areas such as attention, orientation, memory, registration, recall, calculation, language, and the ability to draw a complex polygon [64,65]. A cut-off point of 23/24 responses has been used to select subjects with suspected cognitive impairment or dementia [65], in addition, this tool cannot be used for people with a low educational level since two of its items require knowing how to read and write [66]. Creavin ST. et al., describe a pooled sensitivity of 85% and a pooled specificity of 90% with a cut-off point of 24 points, considering people over the age of 65 in non-specialist, community, and primary care settings [67].

Mini-Cog: Developed as a dementia screening test for community settings [68]. It consists of two components: a three-word delayed recall test that assesses memory and clock drawing such as cognitive function, language, visuomotor skills, and the executive function assessment, with a length of 3-5 minutes approximately [69–71]. The scoring system assigns a value from 0 to 3 points for remembering words to remember correctly, and the clock drawing test is scored as 'normal' or 'abnormal' [69–71]. Once the domains are assessed, it is assigned as a positive test (possible diagnosis of dementia) if the late word recall score is 0, or if their late recall score is 1 or 2, and their clock drawing test is abnormal. A value of 3 in the first domain or 1 to 2 in the same with a standard clock pattern is considered a negative test (no dementia present) [69–71]. Tsoi K. et al., reported a pooled sensitivity of 91% (95% CI, 0.80-0.96) and a pooled specificity of 86% (95% CI, 0.74-0.96), and concluded that compared with other screening tests. Mini-cog had a better diagnostic performance for dementia and is and shorter than the MMSE [68].

In Ecuador, Espinosa del Pozo et al. determined a global prevalence of cognitive impairment of 37.5% by the MMSE and 44.4% by the AD8 in adults over 65 years in Quito [72]. In addition, in a study carried out by the same author, the MMSE determined a prevalence of 30% and 43.7% with the AD8 test in the Santa Cruz-Galapagos [73], demonstrating the high prevalence of this pathology and the importance of its screening.

DEPRESSION

Depression in older adults is a disorder related to functional, cognitive, physical, and social deficiencies associated with high rates of suicide, which leads to impaired functioning in daily life [74,75]. The Center for Disease Control and Prevention (CDC) estimate that depression in older adults ranges from approximately 1 to 5% but increases to 13.5% in those who require home health care and 11.5% in hospitalized patients [76]. For this reason, its diagnosis is vital during medical care, and various instruments have been developed to facilitate its screening and diagnosis. Herein, we will describe the essential scales.

Yesavage Depression Scale: This screening tool helps to measure affective and behavioral symptoms of depression, focusing attention on depressive semiology and quality of life, ruling out symptoms that can be confused with a somatic illness or dementia [77]. It consists of 30 items with dichotomous responses (yes/no) that investigate only symptoms of cognitive disorders during a major depressive episode in the last 15 days, and it typically takes between five and seven minutes to complete. Recently, a reduced version with 15 items was created, where one point is awarded for each affirmative answer (questions 2, 3, 4, 6, 8, 9, 10, 12, 14, and 15) or negative (1, 5, 7, 11, and 13) as appropriate. A score below 5 points is considered within the normal range, 5 to 9 indicates mild depression, and a score above 10 indicates moderate to severe depression[78]. This tool demonstrated to have a sensitivity of 85.3% and a specificity of 85.5%, in comparison with the DSM IV questionnaire of diagnosis of depressive disorder [79].

Cornell Scale of Depression in Dementia: It is a way to detect symptoms of depression in elderly with dementia. This scale includes questions in 5 different areas: mood-related signs, behavior disorders, physical signs, cyclic functions, and ideational alterations. Questions are asked se-

parately of the patient and nearby people, if the answers given by the person being evaluated and the caregiver do not coincide with whoever does the test, the doctor will review additional information [80]. The interpretation will be based on each positive answer to the questions: 0 points: absent, there are no symptoms or observations for that behavior; 1 point: mild to intermittent, the behavior or symptoms are occasionally present; 2 points: severe, the behavior or sign is frequent. A score equal to or greater than 10 indicates probable major depression and a score greater than 18 indicates definite major depression. The sensitivity in patients with dementia is 87%, and without dementia, 82% [80].

Patient Health Questionnaire-9 (PHQ-9): It is considered one of the best instruments for screening for depression in primary care due to its ease of application, scoring, and interpretation [81]. Consisting of nine items that assess the presence of depressive symptoms (corresponding to DSM-IV criteria) present in the last two weeks, each question has a severity index corresponding to 0 = "never," 1 = "some days," 2 = "more than half the days," and 3 = "almost every day." According to the scores obtained on the scale, it will be classified as follows: a score of 10 points or more reflects major depression, and a score of 5 points or more reflects mild depression [82]. This questionnaire showed a sensitivity of 88% and a specificity of 92% compared to the Hamilton scale [83].

Patient Health Questionnaire-2 (PHQ-2): This questionnaire uses the first two questions of the PHQ-9 to detect symptoms of depression and it's a brief alternative for screening for depression. The two questions are about depressed mood and anhedonia, considering their frequency during different periods ("throughout your life") [84]. If the answer is yes to any question this person will be identified as positive for depression [85]. A study carried out assessing this test in comparison with the PHQ-9, identified a sensitivity of 91% (95% CI 0.85-0.94) and a sensitivity of 70% (95% CI 0.64-0.76) [86].

REALITY OF ECUADOR

In Ecuador, since 2010, the 'Norms and Protocols for Integral Health Care of the Elderly' manual has outlined processes to ensure proper management of senior citizens, with the aim of improving and standardizing the quality of care in this age group. The manual suggests the functional assessment through the application of the modified Katz index and the modified Lawton and Brody scale; in the same way, the psychic-cognitive assessment is carried out through the modified MMSE test, modified Pfeiffer and modified Yesavage, requesting finally the nutritional assessment which is done through the MNA scale and the anthropometric assessment [7]. Despite the progress of research in the field of geriatrics, the regulations in Ecuador have not been updated, avoiding the application of new, faster, or more sensitive scales.

Conclusions

In this review, an overview of various tools and assessments commonly used in healthcare to evaluate the health status of elderly individuals is presented. The assessments cover different domains that indicate a dysfunction in the intrinsic ability of the elderly, including cognitive function, depression, nutritional status, and functionality.

These assessments play a crucial role in identifying early health problems, pathologies, or conditions that may lead to disability in elderly individuals. By detecting these issues early, healthcare providers can intervene and prevent their rapid evolution, which can lead to improved health outcomes and a better quality of life for the elderly population.

It is relevant to remark that the use of these assessments is beneficial not only for the elderly population but also for healthcare providers. By detecting these issues early, healthcare providers can intervene and prevent their rapid evolution, ultimately leading to improved health outcomes and a better quality of life for the elderly population.

In Ecuador, it is essential to conduct a thorough analysis of these tools to evaluate their diagnostic efficacy and applicability. This effort aims to enable healthcare providers to gain comprehensive insights into their patients' health status, thus allowing them to devise more effective and personalized treatment plans. It is also important to remark on the crucial role of the interdisciplinary approach and the importance of timely derivation when a loss in the intrinsic capacity of these patients is detected.

Authors contributions

Data collection: All the authors
Methodology: Josué Rivadeneira, Luis Fuenmayor-González
Draft writing: All the authors
Draft edition and supervision: Josué Rivadeneira, Luis Fuenmayor-González
Final manuscript design: Josué Rivadeneira, Luis Fuenmayor-González
Approval of the final manuscript: All the authors

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Conflicts of interest

The authors declare no conflict of interest

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